University of Toronto

COMPUTER SCIENCE NEWSLETTER

No. 104

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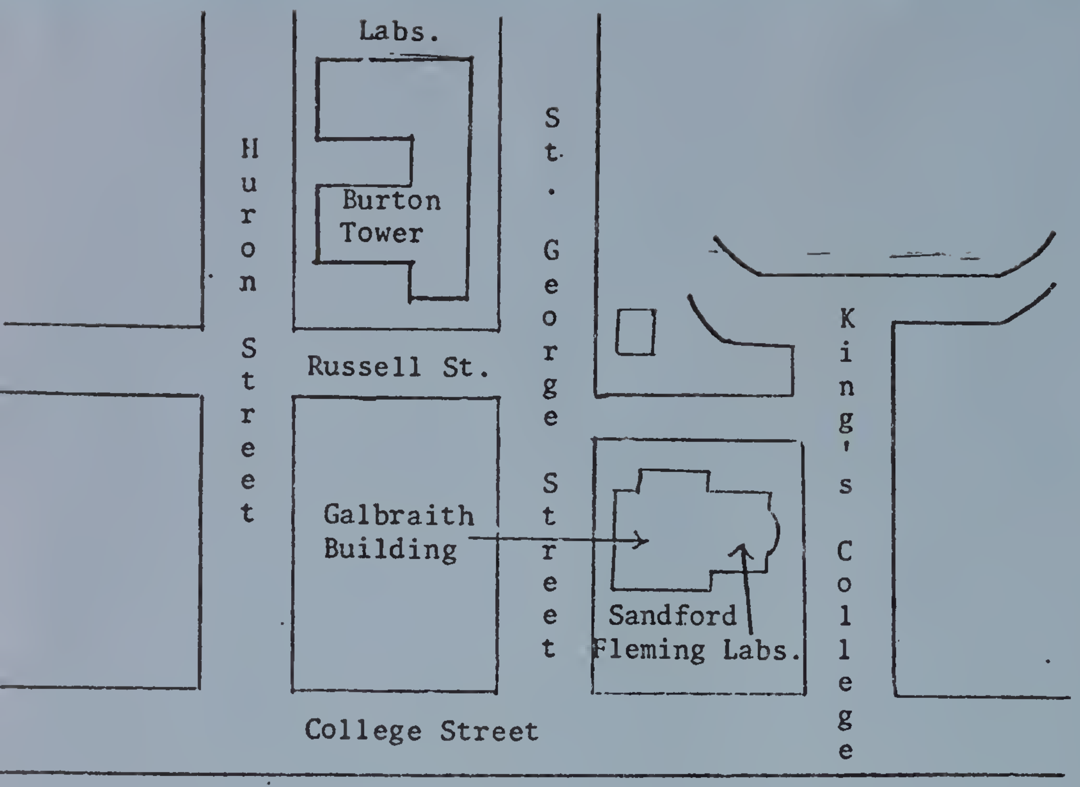
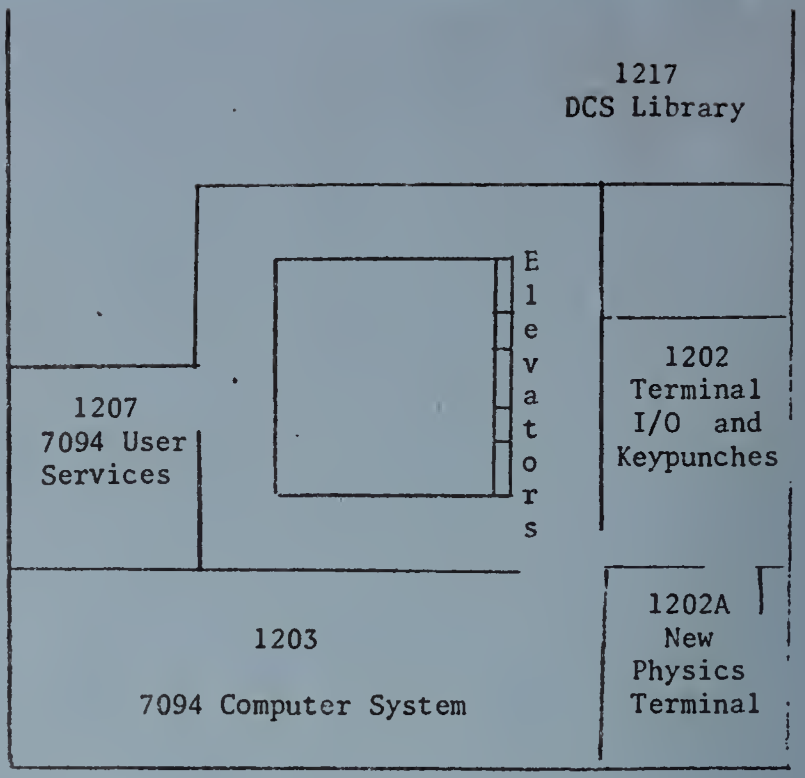
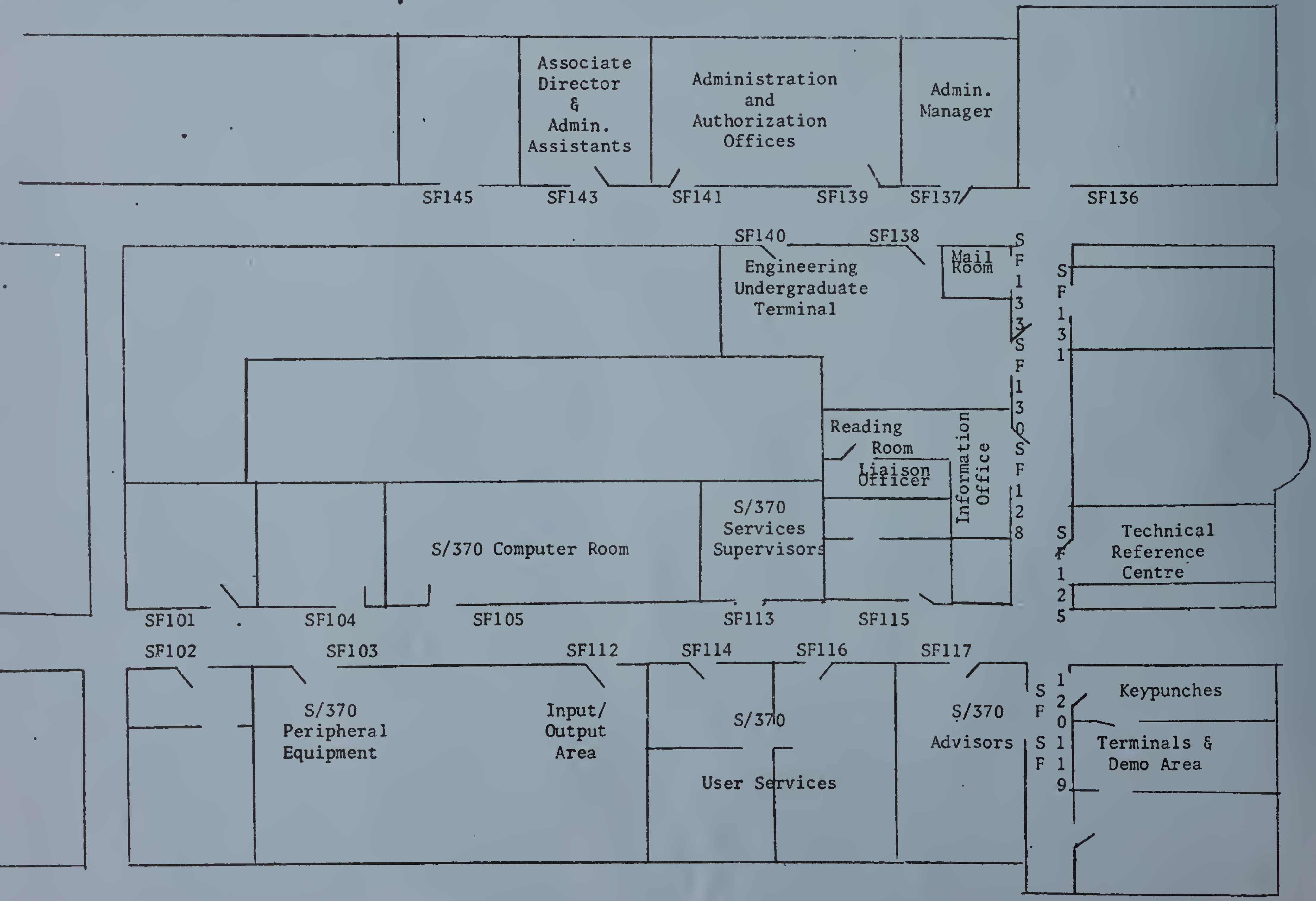




FLOOR PLAN: 12th Floor Burton Tower

FLOOR PLAN: UNIVERSITY OF TORONTO COMPUTER CENTRE

SANDFORD FLEMING LABORATORIES



CRF JOINS UTCC

J. C. Wilson

I am pleased to announce the formal merger of the Computer Research Facility (also known as CRF) and the University of Toronto Computer Centre. CRF will continue to operate as an independent division under the management of Jim McBride.

It is expected that the merger will result in greatly improved service to the users of both CRF and UTCC. The integration of management will allow more effective use of resources particularly equipment, personnel and expertise. Coordinated planning and development of services will be made easier and it will reduce duplication of efforts and the resulting waste of funds.

For those not familiar with CRF, lists of equipment and pertinent telephone numbers are included below with a map of the CRF facilities.

EQUIPMENT LIST

(a) IBM 360/44 with
- 448K core
- 10 disk drives (8 2314's and 2 2311's)
- 2 2401 tape drives
- 2 1403 printers
- 2 2501 card readers
- 2701 data adapter unit
- 2250-1 video display unit

(b) 2 RADDT's
(Remote Analog and Digital Data Terminals)
- connected to the 360/44
- each provide up to 8 channels of data acquisition
- can be used up to 4000 feet from the CRF laboratory
- sample at rates up to 20000 Hz

(c) AD/4 Analog Computer with 20 bipolar integrators, 16 bipolar amplifiers

(d) An 835 Calcomp microfilm plotter which provides facilities for microfilm plotting or film making on 16 mm film. The plotter is connected to the 360/44 and runs about 200 times the speed of a conventional plotter.

(e) Minicomputers, including PDP/8, PDP/11

(f) Several analog tape recorders which are available on a rental basis, including Phillips ANA-LOG 7, Hewlet-Packard 3960, TEAC R70 and Sony TC330

(g) VWol Digitizing Tablet

(h) Photographic equipment and laboratory

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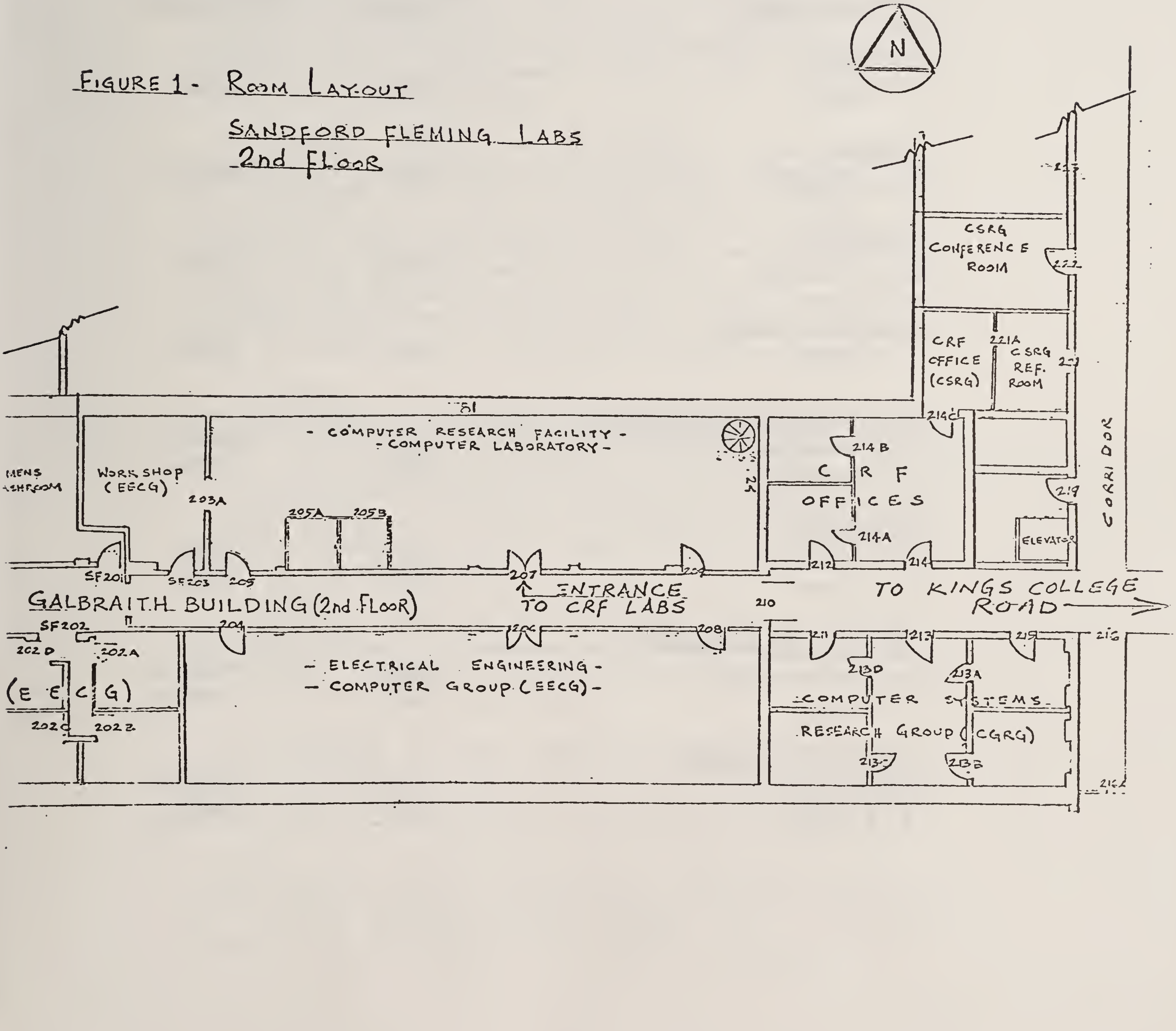
FIGURE 1 - ROOM LAY-OUT

SANDFORD FLEMING LABS
2nd FLOOR



COMPUTER RESEARCH FACILITY

TELEPHONE & ROOM LISTING

Sections/Names	Telephone	Room Number
Enquiries		
L. Ramage	8946	SF214
Manager		
J.R. McBride	4086	SF214B
Secretary		
T.A. Holland	4086	SF214
Account Services		
B.J. King	6326	SF214
Data Acquisition Services		
T.C. Stevens	8853	SF207
A. Bakumenko	6350	SF203
Operations		
K.C. Patnaik	8853	SF207
B.P. Leger	8858	SF207
Research Applications		
M. Hindley-Smith	8992	SF214C
D. Guerin	5271	SF214A
Software Services		
D.R. Smith	7133	SF214C
W. Madryga	5271	SF214A

COMPUTER ASSISTED LEARNING

F. Clancy

There are currently several efforts in the area of APL-based Computer Assisted Learning development at the University of Toronto. Some of the notable developments include work being done by Professor Hurd at Trinity College, by Professors Pitre and Farquhar at Physics, by Professor Dooley at Management Studies, and by Professor Deckers at Erindale College.

Professor Hurd has developed a computer-based communication/instruction routine which is integrated with his teaching of New Testament Greek. Students are encouraged to use the computer terminal for exercises and lessons on the course material. General notices or direct communication with Professor Hurd can be handled by the system. The lessons require the use of a specialized typeball, but efforts are being made to produce a version which will operate on a more easily obtainable typeball.

Professor Hurd is continuing to develop course material with the intent of creating a self study aid which would be useful for an entire course in New Testament Greek.

The Physics Department is working on first year level, supplementary lessons which are planned to be used by students during the fall. They are currently testing and evaluating these lessons.

Management Studies has developed and is currently testing a series of programs which will function as a probability laboratory, which they hope will be a valuable tool in the study of probability.

At Erindale College, Professor Deckers has developed a series of Chemistry lessons the first of which, a simulation of a titration laboratory experiment, is available now in library 326 of the University of Toronto APL system.

Other work being carried out at Erindale includes a logic theorem prover - a lesson in propositional calculus, an electric curcuit analysis lesson, and a series of lessons on differentiation for first year calculus.

At UTCC, the PLATO IV terminal is now operating on a leased dial-up line which is shared with the University of Waterloo, who alo operate a PLATO IV terminal. These terminals operate on the CDC CYBER system at the University of Illinois and enable U of T personnel to experiment with the PLATO system. The schedule and operating instructions may be obtained from Ford Clancy.

For information concerning any developments in CAL at the University of Toronto, please contact Mr. Clancy at 928-6021 (UTCC), or 828-5309 (Erindale College). Demonstrations may be arranged for either the APL or the PLATO systems.

ADCIS CONFERENCE REPORT

F. Clancy

The Association for the Development of Computer-based Instructional Systems Conference was held August 6 - 9, 1973, in Ann Arbor, Michigan. The main topics were CAL in the Health Sciences, the justification and evaluation of CAL material, and new developments in CAL.

The efforts of CAL developers in the U.S.A. have benefitted from more liberal funding than we have had in Canada, and thus there is more material available. The author languages used, however, are limited, with most installations using Coursewriter III in various forms of user-modification. We are in the process of acquiring a catalogue of material available from other institutions.

A list of papers collected is available and there is also a list of Abstracts and miscellaneous materials which can be obtained through Ford Clancy at 928-6021 (UTCC) or 828-5309 (Erindale College).

PERSONNEL CHANGES

P. Kellett

Good Luck to Bill Nevill, Ed Stubbs and Karin Walmark. They are all leaving the Computer Centre this month. We wish them success in the paths they follow.

As we say good-bye to them, we are pleased to welcome two new members to the staff of the Computer Centre. Ellen Jabs has joined us as the Liaison Officer's secretary. Larry Lantz has joined the Interactive Systems section as a programmer operator. We hope you will enjoy working with us.

S/370 RELIABILITY

R. Cavanagh

Uptime for August was 97.6% of scheduled production time with an average of 1.13 unscheduled IPL's per day. Reliability was down slightly from the past three months due primarily to hardware problems with the main console.

	% Uptime	Unsch IPL's/day
Jan 73	96.8	0.87
Feb 73	98.3	1.18
Mar 73	97.8	1.16
Apr 73	97.1	1.39
May 73	98.5	1.20
Jun 73	98.5	1.70
Jul 73	99.4	0.37
Aug 73	97.6	1.13

The major time loss problems were:

Aug 23:	Recurring I/O Errors on the system pack caused numerous system failures.
Aug 27:	Queue device I/O Errors caused HOSRDR (an OS module) to fail resulting in four IPL's.
Aug 29: 30-31:	Loss of the main console caused severe operational difficulties and significant downtime.

```
                    S/370    DOWNTIMES DURING AUG 73

---------------------------------------------------------------------------------------------------------------------------
|                                                  TIME OF DAY (HOURS)                                                     |
|  DAY   REIPL   DUTIME  0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19  20  21  22  23  24|
=========================+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+|
| W  1      1     10     |     S                                                                                          |
| T  2      0      0     |                                                                                                |
| F  3      1     18     |                                                      HF                                        |
| S  4      0      0     |                                                                                                |
| S  5      1     15     |                                    H                                                           |
| M  6   (CENTER CLOSED) |                                                                                                |
| T  7      0      0     |                                                                                                |
| W  8      0      0     |                                                                                                |
| T  9      1      6     |                                           S                                                    |
| F 10      1     10     |                                                                              S                 |
| S 11      0      0     |                                                                                                |
| S 12      0      0     |                                                                                                |
| M 13      0      0     |                                                                                                |
| T 14      1     10     |     S                                                                                          |
| W 15      2     15     |                                       S                                                       S|
| T 16      3     29     |S                                                                             S     S           |
| F 17      1      7     |                                                        H                                       |
| S 18      1     10     |                                                              H                                 |
| S 19      0      0     |                                                                                                |
| M 20      3     23     |                                    HH H                                                        |
| T 21      0      0     |                                                                                                |
| W 22      0      0     |                                                                                                |
| T 23      5     68     |                                       S                                       H   HH HHH       |
| F 24      1     10     |                                                                            S                   |
| S 25      0     10     |                                    H                                                           |
| S 26      1      5     |                                          S                                                     |
| M 27      4     40     |                                                          S S        S             S            |
| T 28      2     21     |                                       S                                      S                 |
| W 29      2     72     |                                H           HHH                                        S        |
| T 30      2    310     |                                HHHHHHHHHHHH             H                             OOHHHHHHH|
| F 31      1     65     |HHHHH                                                                                           |
---------------------------------------------------------------------------------------------------------------------------
LEGEND :    H FOR HARDWARE
            S FOR SOFTWARE                STATISTICS
            O FOR OPERATIONAL
            U FOR UNEXPLAINED

                                        TOTAL SCHEDULED HOURS OF PRODUCTION :  538
                                        TOTAL DOWNTIME (MN)  :  754 , AVG/DAY :  25.13 , AVG/PROD HOUR :   0.70
                                        TOTAL REIPL'S        :   34 , AVG/DAY :   1.13
                                        DOWNTIME RATE IS     :  2.33 PERCENT OF SCHEDULED PRODUCTION HOURS
                    DOWNTIME REPORT ON S/370    FOR AUG 73

----------------------------------------------------------------------------------------------------------------------------
|                                               REIPLS(FREQ) // DOWNTIME (MN)                                              |
| DAY  REIPL  DNTIME 0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95  100|
=====================+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+|
| W  1     1      10 |□*********                                                                                          |
| T  2     0       0 |                                                                                                    |
| F  3     1      18 |□*****************                                                                                  |
| S  4     0       0 |                                                                                                    |
| S  5     1      15 |□**************                                                                                     |
| M  6 (CENTER CLOSED)|                                                                                                   |
| T  7     0       0 |                                                                                                    |
| W  8     0       0 |                                                                                                    |
| T  9     1       6 |□*****                                                                                              |
| F 10     1      10 |□*********                                                                                          |
| S 11     0       0 |                                                                                                    |
| S 12     0       0 |                                                                                                    |
| M 13     0       0 |                                                                                                    |
| T 14     1      10 |□*********                                                                                          |
| W 15     2      15 |□□*************                                                                                     |
| T 16     3      29 |□□□**************************                                                                       |
| F 17     1       7 |□******                                                                                             |
| S 18     1      10 |□*********                                                                                          |
| S 19     0       0 |                                                                                                    |
| M 20     3      23 |□□□********************                                                                             |
| T 21     0       0 |                                                                                                    |
| W 22     0       0 |                                                                                                    |
| T 23     5      68 |□□□□□***************************************************************                                |
| F 24     1      10 |□*********                                                                                          |
| S 25     0      10 |**********                                                                                          |
| S 26     1       5 |□****                                                                                               |
| M 27     4      40 |□□□□************************************                                                            |
| T 28     2      21 |□□*******************                                                                               |
| W 29     2      72 |□□**********************************************************************                            |
| T 30     2     310 |□□************************************************************************************************** 310 |
| F 31     1      65 |□****************************************************************                                   |
----------------------------------------------------------------------------------------------------------------------------

 LEGEND     : ONE □  =ONE REIPL
              ONE *  =ONE MINUTE OF DOWNTIME
```

ONE BILLION BYTES

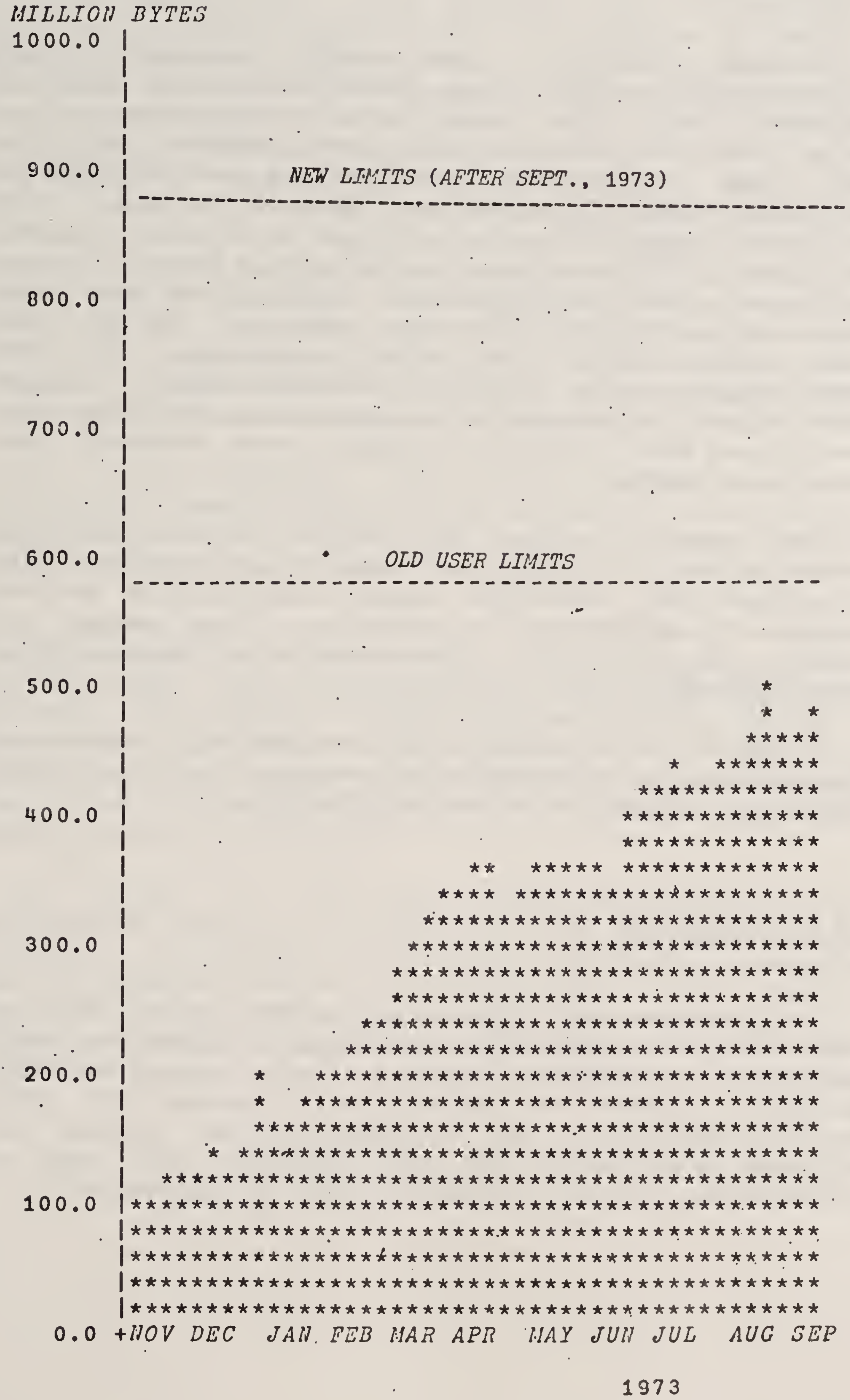
J. Lees

During the last week of September, S/370 Services installed an IBM 3830 controller and two IBM 3330 disk drives. The acquisition of these drives now makes available over one billion bytes of on-line storage (1,175,056,000).

S/370 Services now has ten 3330 disk drives and six 2314 disk drives available for on-line storage, and current plans allow for the installation every four months of two additional drives. As the following chart indicates, there has been a continuing demand for on-line storage. The y-axis is the number of bytes available, and the x-axis is time. The dotted line at 580 indicates the limit of user on-line storage at the time of this article.

The period during April-May in which there is no growth was the time when demand over-reached supply, i.e. there was no storage available. With the addition of the two additional disk drives in September, the user maximum will be 880 million bytes, the remaining 120 million bytes being reserved for system use.

ONLINE DATASET USAGE FOR 72-73
STARTING WEEK OF NOV 1 TO SEPT 9



S/370 OPEN HOUSE

D. Gibson/L. Lubin

As was announced in last month's Newsletter, S/370 Services held its first Open House during the week of September 10-14. The demand for Open House presentations was so great that several sessions were extended into the week. Open House lectures and seminars were presented to over 1900 people. The majority of those who attended were new users, many of whom had never run a job on any system. Approximately 1000 people toured the various teminals where they were shown the facilities available and were given demonstrations of the self-service equipment. The only Open House disappointment was the cancellation of TSO demonstrations as a result of problems with hardware installation. Otherwise, the presentations and tours went smoothly and many favourable comments were received from those who attended.

The over-all success of the Open House cannot be determined until it is seen how well the new users are able to utilize the facilities during the upcoming months. Comments and suggestions for future Open House events are welcomed and should be directed to Mr. D. Gibson, SF125, phone 928-5568.

If there are any groups which were unable to attend Open House and wish an introduction to computing on the S/370-165, please contact Mr. Gibson at 928-5568.

TSO USERS' MEETING

I. Darwin

On September 6, 1973 a large number of TSO, CRJE and other users attended the TSO Users' Meeting where the early delivery of an additional megabyte of main storage and S/370 Services' decision to install full function TSO were formally announced. The remainder of the meeting was dedicated to discussing what these additions will mean to the users and the way in which TSO will be implemented.

Currently, the new memory will allow both CRJE and TSO to be run simultaneously, thus allowing for the gradual phasing-out of CRJE by December 1973. In addition to remote job entry, TSO offers full timesharing service including interactive execution and interactive debugging facilities. Initially, PL/1 Checkout and Optimizer and FORTRAN G1 will be available interactively through TSO. Future TSO enhancements may include ASSEMBLER, FORTRAN H Extended, SPITBOL, WATFIV and several applications packages. Work in improving, updating and adding commands will continue at its present pace. The most important upgrade for RJE users is a complete HASP-OS interface. This will upgrade the SUBMIT, STATUS, OUTPUT, and CANCEL commands, and allow all TSO/RJE user jobs to run under EXECUTOR if they are otherwise eligible. In addition to this HASP-RJE interface work, the on-line dataset interface is being extensively upgraded.

Dr. D. J. McNaughton, the Manager of S/370 Services, discussed the planned implementation of TSO and the division of memory resources. Initially 1200K of the total 3000K will be devoted to batch users. The 1200K is an increase of 200K from the previous amount allocated. This increase should improve batch job turnaround. Time sharing regions will occupy 400K, and the remaining 1400K will be devoted to O/S, HASP, HSJS, CRJE, TSO Control, and other resident functions. The new main storage, combined with the two new 3330 drives, controller, and channel will increase processing capability. For information on the new hardware refer to the article NEW HARDWARE ACQUISITIONS appearing elsewhere in this Newsletter.

The charges for TSO usage were discussed during the meeting. A charging formula has been determined and approved by the UTCC Policy Committee. There is no current plan to implement charges for CRJF, as it is being phased out. The policy of users providing their own typewriter terminals remains the same as it is for CRJE.

The TSO User Meeting concluded with an intensive question and answer period. The questions raised ranged from main storage usage and initiator setup to the terminal policy already mentioned. In response to a question about tape and disk datasets, it was emphasized that datasets on mountable volumes can not be accessed directly through TSO. Instead, they must be copied on-line by means of a background job. A user asked about converting batch jobs to run under TSO and was informed that most programs would require little if any change.

There will be a further opportunity to learn about TSO and have questions answered during the TSO sessions of the fall education program (refer to the article FALL-IN WITH THE FALL EDUCATION SCHEDULE appearing elsewhere in this issue of the Newsletter).

Please watch for USERBOOK updates, other Newsletter articles, and HOTNEWS items for further TSO announcements.

THE TERMINAL CO-ORDINATOR

S. Yagi

Who can help me with my JCL?

What is a Credit Request?

Where can I get documentation on SPSS?

What's a Terminal Co-ordinator?

I think I've found a bug with FORTRAN. Who do I contact? Does anyone care?

Is TSO a new deodorant or what? How do I find out more about it?

The above questions could be asked by any number of S/370 users. Answers to all of the above questions can be obtained from your Terminal Co-ordinator.

This article will explain the function of the Terminal Co-ordinator and the interface system which has been established between Terminal Co-ordinators and central Computer Centre personnel.

Terminal Co-ordinators are located at the following sites:

Terminal	Terminal Co-ordinator
Arts and Science Terminal Room 2105 Sidney Smith Building St. George Campus University of Toronto	Marlene Domoney 928-2043
Erindale College Room 2039 Erindale Campus University of Toronto	Vaughan Lawrason 828-5311
Sandford Fleming Terminal Rooms 117, 112 Sandford Fleming Building St. George Campus University of Toronto	Stan Verscay 928-8591 Advisors 928-8599
Scarborough College Room S624 Scarborough Campus Univeristy of Toronto	Ralph Lombardi 284-3173

In addition, the following personnel provided by terminal sponsors are available for operational assistance at the locations indicated.

Terminal	Personnel
Institute for Aerospace Studies Room 162 Aerospace Studies Building Dufferin Campus University of Toronto	Wolf Graf
Faculty of Dentistry Dentistry Building St. George Campus University of Toronto	Bob Kazluskas
Faculty of Management Studies Room 219 246 Bloor Street West St. George Campus University of Toronto	Paul Roth

New Physics Terminal
Room 1202
Burton Tower
St. George Campus
University of Toronto

Dianne Reckhow

The Terminal Co-ordinator provides assistance and consultation for users of the S/370-165. Questions concerning availability of languages, packages, documentation and procedures for using each terminal should be directed at the Terminal Co-ordinator or designated staff. Questions and problems which cannot be answered will be referred to Central Site staff. Users are only required to see the Terminal Co-ordinator to solve a problem. All referrals and follow-ups will be handled by Terminal Co-ordinators on behalf of the user.

Terminal Co-ordinators cannot be experts in all aspects of computing but there are staff members who are specialists in particular areas of computing. Terminal Co-ordinators rely on these staff members for backup support in specific areas. Currently, S/370 Services has staff members who are specialists in the following areas:

Numerical Analysis
Optimization Method Software
Statistical Packages
Graphics Software
TSO/CRJE
JCL and Utilities
Language Processors (FORTRAN, PL1, ASSEMBLER)

Documentation concerning all aspects of computing on the S/370-165 is contained in USERBOOK Section 3 which may be obtained from the Information Office, SF128 (928-4990 or 928-4991).

USERBOOK Section 3 is prepared by the staff of S/370 Services and is updated frequently to reflect current policy, procedures and software pertaining to the S/370-165. All reference material referred to in the USERBOOK is available at each terminal. Missing documentation should be brought to the attention of the Terminal Co-ordinator.

S/370 Services endeavors to provide a high quality of service to all users. Occasionally problems do occur: software can be incomplete; hardware can malfunction; staff can make mistakes. The primary means for users to obtain credit for jobs which were not run properly is the UTCC Credit Request. A special form is used to submit a Credit Request. Forms are available at all terminal locations and should be submitted to the terminal personnel for approval. Documentation on Credit Request procedures is contained in USERBOOK 3.2190. Credit Requests provide S/370 Services with a valuable feedback mechanism on all aspects of our service.

Users are also invited to make use of the suggestion procedure and graffiti boards to comment or make suggestions on all aspects of our service. Perhaps the most direct and effective procedure is to make your Terminal Co-ordinator aware of your problems or suggestions.

S/370 Services' main function is to provide computing facilities for the University of Toronto. The Terminal Co-ordinator is there to help you use these facilities.

ERINDALE OPEN HOUSE

V. Lawrason

Erindale College will hold an Open House and Official Opening of its new wing on Sunday, October 14, at the Erindale Campus from 1 p.m. to 6 p.m. A visit by Premier William Davis to preside over the ceremony will highlight the event.

The Erindale Computer Centre, along with other departments, will be taking part in the activities. A short video cassette will be available in a video playback unit to give a brief visual introduction to the computing facilities at Erindale. Exhibits of system output including Calcomp, SPSS, Symap and simple assignment problems with accompanying results will be on display. Brief tours of the IBM 360/20 and the keypunches along with basic operating instructions will be given approximately every half hour. In addition, there will be interactive displays demonstrating the 2741 typewriter terminals and Computer Assisted Learning (CAL), a video terminal on loan for the day from the downtown site, as well as a continuous multi-media display in a theatre-like setup to allow visitors to sit down and relax for a few minutes if they wish. Computer Centre personnel will be available throughout the afternoon to answer any questions concerning facilities and services.

Also of interest is the Department of Economics' display where a computer terminal will be connected to an MIT data bank in Boston, containing a model of the Canadian economy. The computer may be questioned about the economy by interested visitors.

Many other activities will be taking place and everyone is cordially invited to attend.

REMCOM TERMINALS

R. Cavanagh

Three Remcom 4780 terminals have replaced the Data 100's at the New Physics, Arts and Science, and Management Studies terminals. The installations went smoothly and were completed September 4 with minimal downtime for each site. Capacity at each location has remained unchanged with the exception of Management Studies where the reader capacity has doubled along with a slight increase in printer speed.

The three terminals are all run "open shop" with users handling all aspects of terminal operation. Instruction and assistance is available from the Terminal Co-ordinators or from central operation. Manuals have been placed at each terminal.

NEW HARDWARE ACQUISITIONS

J. Wettlaufer

The month of September saw major hardware changes on the S/370-165. From September 8 to 11 an extra megabyte of memory was installed by ITEL Canada Ltd. The installation period was initially scheduled to be two days , but unfortunately required four days to complete. The third megabyte of memory was fully operational by September 18.
In addition to the memory installation, two 3330 disk drives and a disk drive control unit were installed on September 14. The extra disk storage will be used for future on-line storage for TSO and batch users. The additional control unit is now attached to an existing second 2880 channel on the CPU. The additional control unit enables us to utilize the second block multiplexor channel on our machine.

GOULD PLOTTER

R. N. M. Radcliffe

A significant change has been made to the original installation plans for the Gould plotter. The plotter which is currently being installed is an on-line unit, not an off-line unit as previously announced. The on-line unit should prove more satisfactory than an off-line unit. The plan to upgrade the unit to a higher resolution model (Gould 5000 series) remains in effect.

The new plotter software has just arrived and will require modifications to make it compatible with UTCC software and accounting routines. The Gould plotter should be available to users in early October.

S/370 OPERATION LOG: A SOURCE OF RELIABILITY DATA

G. Milandre

The S/370 Operation Log is an APL application used for the interactive analysis of large amounts of operations data to produce a series of standard reports.

The console operator maintains an updated log sheet, recording all main events occurring during system operation. Both scheduled and unscheduled events are recorded, along with a description of all system component failures. The APL package stores this data in files and accepts commands to produce reports useful to the user community and Computer Centre management. The reports are made available as a part of the Assurance summaries which are posted on bulletin boards.

Typical reports include:

Daily standardized operation log with running statistics.

Monthly system reliability report which indicates how system time has been divided among the various activities.

Downtime analysis graphs.

Device failure reports which allow checking on individual device reliability.

The charts included in the monthly Newsletter article on S/370 Reliability come from this source.

SORT/MERGE VERSION 1.3

H. Kugel

Effective on or about October 15, 1973, S/370 Services will replace the current SORT/MERGE Version 1.2 with the newer release of the program product, SORT/MERGE Version 1.3. The change will be transparent to the user and the current SORT/MERGE 1.2 will be kept on-line as a backup.

The new version of SORT/MERGE has one significant feature not available in SORT/MERGE Version 1.2. Currently, under the old version, if a sort fails it returns a Condition Code of 16 but processing continues. As a result, the user must test to see if the sort was successful. In SORT/MERGE Version 1.3, S/370 Services has implemented a new option that will allow the failure of the sort to cause the SORT/MERGE processor to abend with a user completion code of 16. As a result, the user need not test to see if the sort was successful. This feature has been implemented after UTCC and user consultation.

Any questions or problems should be directed to Herb Kugel at 928-7286.

OPTIMIZATION AND NUMERICAL METHODS

W. Hayes

IMSL Library 1 (Edition 3) - New Features

LEQ1PB LEQ2PB	Linear Equation Solvers for Positive Definite Band Symmetric Matrices
LIN1PB LIN2PB	Matrix Inversion Routines for Positive Definite Band Symmetric Matrices
LUDAPB LUELPB LUREPB	Decomposition, Substitution, and Improvement Routine for Positive Definite Band Symmetric Matrices
ZBRENT	Brent's Algorithm for the Efficient Location of Zeros of Real Functions in Given Intervals
ZXFIB	Fibonacci Search for the Minimum of One-Dimensional Unimodal Functions

MATHLIB Collection - Additions

CADRE	Integration of a Function by Cautious Adaptive Romberg Extrapolation
SQUANK	Integration by Adaptive Simpson's Quadrature

A description of the organization and use of the Program Library for Optimization and Numerical Methods is included in USERBOOK Chapter 3.7. This document is available in the Information Office SF 128.

RELEASE 20.1 AND 21.7 PROCESSORS

H. Kugel

S/370 Services has been maintaining, as a backup, the Release 20.1 Source language processors (i.e. COBOL (Version 2), PL/1-F, FORTRAN G, FORTRAN H, ALGOL-F and RPG) as well as Assembler-F. The program product processors, FORTRAN G1 and FORTRAN H extended, both PL/I compilers (Optimizing and Checkout) and ANSI COBOL Version 3, are now the defaults for all UTCC catalogued procedures.

Since there has been virtually no usage of the Release 20.1 processors during the last three months, they will be scratched and replaced by the OS Release 21.7 processors. These new processors are the last release of OS processors, and they will work on any future virtual system which may be configured when OS/360 as such is finally replaced at UTCC.

These changes are transparent to the user and no JCL changes are required. Users encountering difficulties should contact Herb Kugel at 928-7286.

ASUT/EUT ADVISING HOURS

M. Tapia

Advisors began working at EUT and ASUT on Monday, September 17, 1973. Advisors will be on duty at both terminals:

10:00 - 18:00	Monday-Friday
12:00 - 17:00	Saturday

All advisors know PL/I (including PL/C and PLUTO), WATFIV, and SPITBOL. Many are competent in several of the other languages as well. If users experience any difficulty in using any of the HSJS language processors, contact the advisor at ASUT (SS1071) or at EUT (SF140) during advising hours.

HOURS OF SERVICE: THANKSGIVING HOLIDAY

J. Campbell

The following hours of service will be in effect for S/370 Services' users during the Thanksgiving Holiday:

	October 6 (Saturday)	October 7 (Sunday)	October 8 (Monday)
I/O Services (SF112)	9 a.m. - 5 p.m.	9 a.m. - 5 p.m.	closed
EUT	9 a.m. - 5 p.m.	9 a.m. - 5 p.m.	closed
ASUT	10 a.m. - 5 p.m.	10 a.m. - 5 p.m.	closed
AST	10 a.m. - 5 p.m.	10 a.m. - 5 p.m.	closed

Normal hours of service will resume at Midnight Monday, October 8.

FALL-IN WITH THE FALL EDUCATION SCHEDULE

D. Gibson

Do you want to learn about the computer -- another language or advance your knowledge of a language? Then the Computer Centre's non-credit short courses are for you.

How do you register? Simple -- just fill in the attached sheet and mail it to the Computer Centre two weeks prior to the start of the course. Your confirmation will be mailed to you.

How much? Only the cost of an envelope and an 8¢ stamp (free if you use campus mail). No authorization code or special materials are required. The number of people that can be accommodated is limited SO MAIL YOUR REGISTRATION YESTERDAY!

**Note: Most courses are scheduled for five days; but may be shortened at the instructor's discretion.

COURSE OUTLINE

Introductory Courses

Basic Introduction

For those who have no knowledge of computing and wish to alter that condition.

Date: October 22 - 26
Time: 3 - 4 p.m.
Location: Galbraith 120

Advanced Introduction

For those who have computed elsewhere and will now be running jobs at UTCC. The emphasis will be on the peculiarities of the S/370-165, including installation-dependent JCL.

Date: October 22 -26
Time: 4 - 5 p.m.
Location: Galbraith 120

Elementary Courses

For those who wish to learn an initial language or to be introduced to an additional language.

Elementary FORTRAN (using WATFIV)

Date: October 29 - November 2
Time: 3 p.m. - 4 p.m.
Location: Galbraith 120

Elementary PL/1

Date: November 5 - 9
Time: 4 p.m. - 5 p.m.
Location: Galbraith 120

Elementary ASSEMBLER

Date: November 12 - 16
Time: 4 p.m. - 5 p.m.
Location: Galbraith 120

Intermediate Seminars

For those users who are familiar with a language and wish to expand their knowledge of it. The topics and subject matter of each session will be tailored to meet the requirements of those attending as the seminar leader will be responding to users' questions and problems.

Intermediate SPITBOL

Date: October 29 - November 2
Time: 4 - 5 p.m.
Location: Galbraith 120

Intermediate JCL

Date: November 5 - 9
Time: 3 - 4 p.m.
Location: Galbraith 120

Intermediate FORTRAN

Date: November 12 - 16
Time: 3 - 4 p.m.
Location: Galbraith 120

Special Courses

Time Sharing Option (TSO)

For those who are presently using the S/370-165 and wish to move to an interactive approach. The TSO presentations will also be of interest to those who are presently using CRJE.

Session 1

What is TSO and what can it do for you?

Date: October 22 - 25
Time: 4 - 5 p.m.
Location: Sandford Fleming 222

Session 2

Interactive TSO and how to use it.

Date: October 29 - November 1
Time: 4 - 5 p.m.
Location: Sandford Fleming 222

Session 3

Advanced debugging with TSO.

Date: November 5 - 8
Time: 4 - 5 p.m.
Location: Sandford Fleming 222

The ALLOC Utility

For users of the Computer Centre who are presently using on-line storage or will be using it. ALLOC is a useful and powerful UTCC utility which manipulates on-line datasets. If you don't now how to use it, you may wish to attend.

Date: November 1
Time: 1 - 3 p.m.
Location: Galbraith 202

Elementary Plotting

For those who wish to learn the basic techniques of plotting with the Calcomp and Gould plotting equipment. Intermediate knowledge of JCL and FORTRAN is required.

Date: November 19 - 23
Time: 4 - 5 p.m.
Location: Galbraith 120

Statistical Package for the Social Sciences (SPSS)

For Social Sciences users who are or will be using the computer to process their data. SPSS is an applications oriented programming language which contains powerful routines for the analysis of data while allowing the user to manipulate his data with simple FORTRAN-like statements.

Date: November 19 - 23
Time: 3 - 4 p.m.
Location: Galbraith 120

Registration for Computer Centre Short Courses

Name: ____

Address: ____________________________________

Telephone: __________________________________

Department: _________________________________

Status: Student (undergrad) __ Student (grad) __
Faculty __ Staff __
Other __

Please indicate the course(s) in which you wish to enroll.

__ Basic Introduction
__ Advanced Introduction
__ Elementary FORTRAN (WATFIV)
__ Elementary PL/1
__ Elementary ASSEMBLER
__ Intermediate SPITBOL
__ Intermediate JCL
__ Intermediate FORTRAN

TSO
__ Session 1
__ Session 2
__ Session 3
__ ALLOC
__ Elementary Plotting
__ SPSS

Your enrolment will be confirmed by mail.

Other courses of interest for future dates:

____

____

Additional registration forms are available in the Information Office Room 128 Sandford Fleming Building.

(Fold on dotted line on the reverse -- this form is preaddressed. Campus mail is free.)

Fall Education
Room 125
Sandford Fleming Building
10 King's College Road
University of Toronto Computer Centre
University of Toronto

ITS SOFTWARE DEVELOPMENT

S. Goldfarb

The Interactive Systems Group programming staff consists of Nick Trufyn and Vaclav Pokorny with considerable contributions from Holley Taylor and Sam Goldfarb. Their responsibilities include (among many other things) software maintenance and development for each of the software components of the S/360 configuration, viz OS-MVT, HASP, APL, ATS and CPS. With many useful APL extensions already being developed and made available by Scientific Time Sharing Corp. and I. P. Sharp Associates Ltd., the system programming staff has been able to concentrate its own development efforts on software extensions to the ATS and HASP facilities. Many of our extensions to ATS are already known to our ATS users; user documentation for other extensions has only recently been completed and will appear in Section 4 of the USERBOOK. The remaining extensions affect the ATS operating environment rather than the user and so do not receive the publicity afforded user-oriented modifications. One (175-page) volume of detailed description for some of the extensions has long since been completed and made public (a copy is retained in the UTCC Technical Reference Centre). The modifications documented in that volume have already been requested by and distributed to 16 other ATS installations in North America. The remaining modifications are currently being detailed and will comprise two more such volumes. The interest expressed by some of our users has prompted us to include in this issue of the Newsletter brief abstracts of a few of the extensions we have made to ATS and HASP.

1) Interrupt support allowing the striking of the ATTN key to interrupt terminal output. For LEARN-ATS, the ATTN support returns information indicating the point at which the lesson was interrupted. The implementation also allows interruption of the sign-off message with the effect of retaining the computer connection on dial-up terminals while signing off the account.

2) Several modifications were added involving accounting for resources used: accumulating data on connect time usage, disk storage utilization and high speed peripheral operations (lines printed, tape mounts, etc.).

3) The maximum number of accounts allowed in ATS was increased from 253 to 65533.

4) ATS required a dedicated tape drive for tape peripheral operations. Modifications were made to allow (dynamic) access to tape drives without the need for pre-allocating a drive to the ATS system.

5) To reduce the time (and number of tapes) required to do the daily backups, a modification was made to allow incremental backups so that only documents saved since the previous full backup were copied to tape.

6) A global locate/replace feature was added to provide a facility for locating, deleting and replacing characters or words throughout an entire document or any range of lines of a document. The locate/replace command was subsequently extended with an option providing the total number of "hits" encountered instead of printing the line numbers involved.

7) The print formatter capabilities were expanded by the addition of 'ts' (single-space), 'td' (double-space), 'ti' (set indentation), 'tw' (set width), 'tj' (right-margin justification), 'tjn' (no right-margin justification), 'tfc' (formatted centering), 'tl' (set lower/upper case text mode), 'tln' (set upper case only text mode) commands which could be imbedded within the document.

8) A COPY command was added to provide a means for duplicating lines of text. The COPY command acts in a manner similar to the MOVE command except that the original lines are retained.

NEW APL WORKSPACE DOCUMENTATION FORMAT

G. Hardy/M. Acfield

In accordance with documentation standards suggested by the APL Workspace Interchange Committee of the SHARE APL Project Group, the documentation for the APL Public Library Workspaces has been reorganized to the following formats:

The variable 'ABSTRACT' contains the general purpose of the Workspace.

The variable 'SOURCE' contains information on where the functions in the Workspace originated (if known), when the Workspace was last updated, and whom to contact in case of any questions.

The variable 'DESCRIBE' contains a list of the functions in the Workspace with a brief description of each and a pointer to any further documentation (if any), a list of the important global variables and the uses of each (if necessary), a list of all groups in the Workspace showing the functions and variables in each group, and other general information.

Detailed documentation for major functions is contained in a series of variables whose names are constructed from the name of the function followed by the characters 'HOW'. For example, if the function is named 'PLOT' the documentation variable is 'PLOTHOW'. The presence of a (FUNCTION)HOW variable for a particular function is indicated in the 'DESCRIBE' variable.

The function 'HOW' in the Workspace prints out all of the (FUNCTION)HOW variables.

All of the documentation functions and variables in the Workspace are grouped under the name 'DOCUMENTATION'. To erase all documentation from a Workspace, type:

```
)ERASE DOCUMENTATION
```

and to get only the documentation from a Workspace, type:

```
)COPY libnum wsname DOCUMENTATION
```

where "libnum" is the appropriate library number and "wsname" is the Workspace name.

TEKTRONIX 4013 GRAPHIC DISPLAY TERMINAL

S. Goldfarb

The University of Toronto Computer Centre has recently acquired a Tektronix 4013 Graphic Display Terminal. The 4013 provides the complete APL graphics (including composite symbols formed by backspacing and overstriking) plus the entire upper and lower case ASCII character set. The choice of APL, ASCII, or the TTY character subset is made right at the Terminal keyboard, either by switch selection or control character sequences.

The 4013 features the Tektronix direct view storage Cathode Ray Tube as its display medium. The computer interface provides switch-selectable data rates of 110 baud to 9600 baud. For example, the terminal may be used on ATS at 150 baud and on APL at 300 baud. The terminal has excellent graphics capabilities and a software graphics package for APL (PLOT-10 APL/GRAPH) is available to assist the APL user with his graphics requirements. The APL/GRAPH package works using a 'vertical window' concept. Lines and points are plotted in an arbitrary (two-dimensional) space, which is then projected onto the face of the terminal. This projection is onto a so called 'screen window' which may be positioned anywhere on the face of the screen.

The plotting package itself is divided into four major sectors: Utility, Vector Plotting, Alphanumerics, and X-Y Plotting. The Utility section includes functions to properly initiate and terminate a session at the terminal. The unique properties of the terminal are supported: these include erasing of the screen, ringing of the audible bell, and hard copy generation. While doing vector plotting, one has the ability to define window boundaries within which the vectors are to be drawn. The vectors generated can be either absolute or relative to previously drawn vectors. Scaling and rotation can be done automatically. Functions are included to allow vector drawing in centimeters and inches. This section also contains complete support of the graphics input facility on the 4013. A complete group of functions to facilitate alphanumerics handling is available. These include functions to generate a new line, carriage return, line feed, back space, and home. In this section are functions to generate a new page, set up both horizontal and vertical tabs, and define software margins. Plotting functions are available to graph X-Y coordinates on cartesian, semi-log, log-log, or polar coordinate systems. These graphs may or may not contain grids for data accuracy.

Functions are also available which facilitate date-time and stock market (High, Low, Volume, Close) graphs. For those more business oriented, functions are available to generate pie charts and histograms with ease. This section also contains a function which allows curve fitting with plotted results." (From 'Tektronix introduces APL/GRAPHICS: The 4013 APL System')

A 4610 Hard Copy Unit is attached to the 4013 terminal for providing hard copy reproduction of the terminal screen in only a few seconds.

The Interactive Systems Group is currently experimenting with the 4013 and the APL/GRAPH software. Interested users may contact the Interactive Systems Group (928-3787) for more information.

BROWNBOX INFORMATION RETRIEVAL SYSTEM

S. Goldfarb

In the March 1973 issue of this Newsletter, the Interactive Systems Group announced the completion of an APL package called the "Brownbox Information Retrieval System". That article, prepared by Doug Flower (author of the Brownbox package), is reproduced in this issue for the benefit of our new users:

"The Interactive Systems Group of the Computer Centre has developed an information retrieval package for APL. This Brownbox (as opposed to blackbox) system consists of a set of functions that greatly simplify information system writing for a variety of applications. Data can be stored in a record format where each record consists of a group of fields. Fields can be either character or numeric and either fixed or variable length. The presence of any particular field in a record is entirely optional. Any field can be inserted into or deleted from any record at any time. When a field is not present it takes up no space in the record.

The system automatically maintains indices over all fields the user declares as indexed. An index allows the user to retrieve records by specifying the contents of a field in the record. The user does not have to know the location of the record. For example, a student's record could be retrieved merely by specifying the student's name.

When two or more people are simultaneously working with the same set of files, the system maintains file integrity through the use of a sophisticated interlock mechanism. A variant of this same mechanism provides the user with a backup capability - if a mistake is made while altering a file, the file can be completely restored to its original state simply by typing 'OUT'.

System security allows detailed control of a user's access to the files. A user can be given read and/or write access on a field by field basis. That is, a user could be given read access to some fields in a record, write access to others, and no access at all to the remainder. Different users can be given different access permissions."

Technical documentation is available from the Information Office, Sandford Fleming, Room 128 (928-4990).

DEPARTMENT OF ZOOLOGY'S BIOLOGY 110 STUDENT RECORD SYSTEM

J. Kornatowski

What do you do if: you have 24 separate sections in your course; you have over 30 exams per student; you have an enrolment of over 2,000 students?? You computerize - quick!!

In July 1972, BIOLOGY 110 was set up as a multi media learning project for 300 students. A feasibility study showed that a computerized on-line record keeping system would be an invaluable aid and so a pilot system was developed on CPS. Experience with this prototype system established our needs, set standards and led to new concepts. However, the anticipated enrolment of 2,000 students for BIOLOGY 110 would prove too much for CPS to handle.

In May 1973, the Interactive Systems Group stepped in to help develop a similar system on APL employing their Brownbox data management package. The record keeping system was completed in time for registration this year. And how pleased we are with all it does! The programs have been designed with two major objectives in mind: (1) to record and process a large amount of interrelated data and have the results available quickly and (2) to have a scheme that a technician or secretary could operate. We feel that the facility developed on APL satisfies our objectives: we have immediate on-line access to the records of over 2,000 students; the system sections students, keeps track of and asks for student marks on a per section basis and produces summary lists of how the students are doing and lots more!

We access the system using a Datapoint 3300 CRT at 30 characters per second providing fast, silent, no hard copy (thus confidential) information: for long lists, mark summaries, sign up sheets, and so on, we merely type in a command and our long lists are printed on the high speed printer at the Computer Centre; short lists can be printed out immediately on any IBM 2741 or Teletype terminal in our building.

We feel that this system is an effective solution for keeping track of our student records. We welcome and encourage interested parties from other departments to come and see our system in operation. It might be just what you need, too!

For a free tour, phone:

Dr. B. Smith (BIO 110 Team Leader) 928-2084
or John Kornatowski (Zoology Systems Analyst) 928-5303

INTERACTIVE SYSTEMS RELIABILITY

K. Jain

The uptimes achieved for the month of August for each of APL, ATS and CPS were 97.29%, 98.29% and 98.24% respectively. The total number of scheduled hours of operation during the month of August were 490. In addition to the scheduled time APL, ATS and CPS were also available for approximately 132 hours of unattended weekend operation.

The following table summarizes the time lost out of scheduled hours of operation. There were three late starts during the daily schedule due to hardware errors resulting in total delay of 567, 272 and 281 minutes for APL, ATS and CPS respectively. The table shows the time lost due to system failures for each of the systems: two unscheduled IPL's were required as a result of the failures. Problems with the Disc Control Unit and CPU accounted for most of the downtime.

Date	Downtime (Mins)			Reason
	APL	ATS	CPS	
Tue. August 7	10	12	14	*Storage Check (Hardware)
Wed. August 15	9	6	10	*Solid System (Undetermined)
Wed. August 29	210	210	210	CPU Failure (Hardware)
Total	229	228	234	*IPL Required

GENERAL NEWS

CRF-UTCC Merger

J. R. McBride

CRF is quite pleased to see the final approval of the CRF-UTCC merger (see lead article on Page 1 of this Newsletter for details. Ed.).

The merger, started by a letter from CRF to its Policy Committee in December of 1971, has taken a lot of work on everyone's part, particularly during the past year. The benfits of the merger will become increasingly obvious to our users as the services are integrated.

CRF Users' Meeting

K. C. Patnaik

The monthly Users' Meeting was held in the Sandford Fleming Laboratories, Room SF222, at 3:00 p.m. on Friday, July 27, 1973. A number of questions were raised which could not be answered. In the August meeting held on August 24, 1973, J.R. McBride responded to the questions raised at the July meeting. He also outlined and discussed the changes to the Grade 'A' operator training and certification procedure.

DIGITAL SIGNAL PROCESSING AT CRF ON-LINE FOURIER ANALYSIS

M. Hindley-Smith

In the late 1960's CRF entered the field of digital signal processing with the RADDT's (Remote Analog-Digital Data Terminals), data acquisition devices which make it possible to monitor continuous signals from sensing devices, digitize the signals and store the digital representation on regular 9-track magnetic computer tape.

1972 marked a sizeable step forward with the creation of RADGRAPH, a program which enables the user to examine his RADDT tape data via the IBM 2250 graphics device, interactively viewing a continuous pictorial display of his data.

Now CRF wishes to announce a further substantial advancement in its signal processing technique with the addition to RADGRAPH of an interactive Fast-Fourier Transform Capability.

Since the publication in 1965 of the Cooley-Tukey algorithm, which typically reduces Fourier transform computations by several orders of magnitude, spectral analysis (Fourier analysis) has become perhaps the single most important tool in such diverse fields as biomedical signal processing, seismology, sound and vibration analysis, etc.

The incorporation of the FFT algorithm into RADGRAPH now makes it possible for a user to examine, simultaneously and interactively, pictorial representations of his data in both the frequency and time domains.

If you would like to know more about RADDT's, RADGRAPH or the RADGRAPH FFT, please call Bill Madryga at 928-5271.

If you would like to discuss the feasibility of applying spectral analysis in your particular discipline, please call Malcolm Hindley-Smith at 928-8992.

FORTHCOMING "SMALL COMPUTER SEMINARS" AT CRF

M. Hindley-Smith

Recently CRF announced that it was planning a series of presentations by leading industrial innovators in the small computer field.

The series has a two-fold purpose - first, to familiarize University scientists, engineers and others with currently available small computer technology; second, to provide industry with a valuable source of feedback.

The seminar-demonstrations will be held on selected Tuesday afternoons at 3:00 p.m. in Room 248 of the Galbraith Building, and everyone is welcome to attend.

We now take pleasure in announcing the first three seminars in the series:

Date: October 2nd, 1973
Topic: "A Minicomputer Voice-Response System"
Speaker: Mr. Gene Graber
Interface Systems, Inc.
Ann Arbor, Michigan

Mr. Graber will discuss and demonstrate the S-11, a complete Voice-Response System for the DEC PDP-11 family of minicomputers. This inexpensive, plug-in expansion provides the hardware and software necessary for the computer to produce spoken English over an included loud speaker. A telephone coupler provides interconnection to the telephone network. This allows the computer to answer an incoming call, to recognize the Touchtone signals as computer inputs and to respond to the caller in English speech. Thus any telephone can be used as a remote terminal to the minicomputer.

Date: October 16th, 1973
Topic: "How to Buy a Minicomputer"
Speaker: Mr. Doug Dyment
Datagen of Canada Ltd.
Richelieu Park, Quebec.

Date: October 30th, 1973
Topic: "An Inexpensive APL Microcomputer"
Speaker: Mr. Ted Edwards
Micro Computer Machines Ltd.
Toronto, Ontario.

For further information about the series, speakers, topics, etc., please call Malcolm Hindley-Smith at 928-8992.

UTCC DIRECTORY

	ROOM	PHONE 928-
DIRECTOR		
John C. Wilson	49 St.Geo	6496
ASSOCIATE DIRECTOR		
Dave McNaughton	SF143	6281
USER LIAISON OFFICER		
Bill Greene	SF128A	2694
Information Office	SF128	4990 or 4991
ADMINISTRATION MANAGER		
Jerry Palter	SF137	8948
AUTHORIZATION CLERKS		
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OPERATIONS SUPPORT SUPERVISOR		
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SYSTEM SOFTWARE SUPERVISOR		
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PROGRAM ADVISORS	SF117	8599
INTERACTIVE TERMINAL SYSTEMS		
MANAGER		
Sam Goldfarb	49 St.Geo	3787
7094 SERVICES		
MANAGER		
Joyce Walton	BT1207	7094

JOB STATUS QUERIES:

SYSTEM/370	7373
7094	7094

INTERACTIVE TERMINAL SYSTEMS:

System Status	6234
APL	7200
ATS	7100
CPS	6200

CONVERSATIONAL REMOTE JOB ENTRY (CRJE)

2741: Tel: 7223 7381 7386

TTY: 7445

UTCC COMPUTER EQUIPMENT

(a) SYSTEM/370 MODEL 165

- located in SF 103/105/112
- provides General Purpose Job Stream, High Speed Job Stream and Conversational Remote Job Entry services
- 2048K bytes of memory
- 1 drum
- 8 disk drives IBM (3330)
- 8 disk drives IBM (2314)
- 6 magnetic tape drives (4 9-track and 2 7-track)
- 6 display consoles
- 6 printers
- 5 card readers
- 1 card punch
- 7 remote batch terminals
- 1 paper tape reader
- CALCOMP plotter (11" and 30")

- OS/MVT with HASP

(b) SYSTEM/360 MODEL 65

- located in McLennan Physical Laboratories
- provides Interactive Systems Service
- 1536K bytes of core
- 16 disk drives (2314)
- 2 9-track magnetic tape drives
- 1 printer
- 1 card reader
- 1 card punch
- 140 typewriter terminals

- OS/MVT with APL, ATS, and CPS

(c) 7094 II

- located in Room 1203 Burton Tower
- 32K words of core
- 1 disk
- 8 magnetic tape drives
- input/output via a 1401 computer

UNIVERSITY OF TORONTO
COMPUTER CENTRE,
TORONTO, CANADA.

MR.D.A.SMITH
SERIALS DEPARTMENT
UNIV. OF TORONTO LIBRARY
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